

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 ~~Claim 1 (currently amended)~~: A multiband data
2 communication apparatus which receives signals by switching a
3 plurality of frequency bands in response to a band switching
4 signal, said multiband data communication apparatus
5 comprising:
6 quadrature demodulating means for converting either a
7 reception signal or a reception intermediate
8 frequency signal into a quadrature reception
9 baseband signal, said quadrature demodulating means
10 including:
11 a pair of first quadrature mixers for converting
12 either the reception signal or the reception
13 intermediate frequency signal into a reception
14 baseband signal;
15 local oscillating means for producing a local
16 oscillation signal; and
17 phase shifting means for shifting a phase of said
18 local oscillation signal based upon said band
19 switching signal to thereby supply the phase-
20 shifted local oscillation signal to said first
21 quadrature mixers.

1 Claim 2 (currently amended): A multiband data
2 communication apparatus which transmits signals by switching a
3 plurality of frequency band in response to a band switching
4 signal, said ~~multiband~~ multiband data communication apparatus
5 comprising:
6 quadrature modulating means for converting a quadrature
7 transmission baseband signal into either a

8 transmission signal or a transmission intermediate
9 frequency signal, said quadrature modulating means
10 including:
11 a pair of second quadrature mixers for converting a
12 transmission baseband signal into either the
13 transmission signal or the transmission
14 intermediate frequency signal;
15 local oscillating means for producing a local
16 oscillation signal; and
17 phase shifting means for shifting a phase of said
18 local oscillation signal based upon said band
19 switching signal to thereby supply the phase-
20 shifted local oscillation signal to said second
21 quadrature mixers.

C.Catt.

Claim 3 (original): A multiband data communication apparatus comprising:

3 quadrature modulating means for converting a quadrature
4 transmission baseband signal into either a
5 transmission signal or a transmission intermediate
6 frequency signal;
7 quadrature demodulating means for converting either a
8 reception signal or a reception intermediate
9 frequency signal into a quadrature reception
10 baseband signal; and
11 local oscillation signal producing means for supplying a
12 local oscillation signal to both said quadrature
13 modulating means and said quadrature demodulating
14 means, for transmitting/receiving by switching a
15 plurality of frequency bands in response to a band
16 switching signal,
17 wherein said quadrature demodulating means includes a
18 pair of first quadrature mixers for converting
19 either the reception signal or the reception

20 intermediate frequency signal into a reception
21 baseband signal;
22 said quadrature modulating means includes a pair of
23 second quadrature mixers for converting a
24 transmission baseband signal into either the
25 transmission signal or the transmission intermediate
26 frequency signal; and
27 said local oscillation signal producing means includes
28 local oscillating means for producing a local
29 oscillation signal, and
30 phase shifting means for shifting a phase of said local
31 oscillation signal based upon said band switching
32 signal to thereby supply the phase-shifted local
33 oscillation signal to said first quadrature mixers
34 and said second quadrature mixers.

C1 Cont.

2 Claim 4 (original): A multiband data communication
3 apparatus as claimed in claim 1, 2, or 3, wherein said phase
4 shifting means supplies a signal obtained by shifting the
5 phase of said local oscillation signal by $\pi/2$ to one of said
6 first quadrature mixers and said second quadrature mixers,
7 while said phase shifting means supplies one of said local
8 oscillation signal and a signal obtained by inverting a code
9 of said local oscillation signal to the other of said first
10 quadrature mixers and said second quadrature mixers in
 response to said band switching signal.

1 Claim 5 (original): A multiband data communication
2 apparatus as claimed in claim 1, 2, or 3, wherein said phase
3 shifting means supplies said local oscillation signal to one
4 of said first quadrature mixers and said second quadrature
5 mixers; while said phase shifting means supplies one of a
6 signal obtained by shifting the phase of said local
7 oscillation signal by $\pi/2$ and a signal obtained by shifting

8 the phase of said local oscillation signal by $\pi/2$ and by
9 inverting said phase-shifted local oscillation signal to the
10 other mixer of said first quadrature mixers and said second
11 quadrature mixers in response to said band switching signal.

1 Claim 6 (original): A multiband data communication
2 apparatus as' claimed in claim 1, 2, or 3, wherein phase
3 shifting means supplies said local oscillation signal to one
4 of said first quadrature mixers and said second quadrature
5 mixers, while said phase shifting means supplied one of a
6 signal obtained by delaying the phase of said local
7 oscillation signal by $\pi/2$ and a signal obtained by advancing
8 the phase of said local oscillation signal by $\pi/2$ to the other
9 of said first quadrature mixers and said second quadrature
10 mixers in response to said band switching signal.

1 Claim 7 (original): A multiband data communication
2 apparatus which receives signals by switching a plurality of
3 frequency bands in response to a band switching signal, said
4 multiband data communication apparatus comprising:

5 quadrature demodulating means for converting either a
6 reception signal or a reception intermediate
7 frequency signal into quadrature reception baseband
8 signal, said quadrature demodulating means
9 including:
10 a pair of first quadrature mixers for converting either
11 the reception signal or the reception intermediate
12 frequency signal into a reception baseband signal;
13 storage means for saving thereinto discrete data 'of a
14 frequency pattern component functioning as a base;
15 address generating means for generating an address every
16 preselected clock;
17 phase shift means for adding a predetermined number based
18 upon said band switching signal to said address;

19 first analog converting means for analog-converting data
20 which is read out by addressing said storage means
21 based on the address outputted from said address
22 generating means to thereby supply the analog-
23 converted data to one of said first quadrature
24 mixers; and
25 second analog converting means for analog-converting data
26 which is read out by addressing said storage means
27 based on the output of said phase shift means to
28 thereby supply the analog-converted data to the
29 other of said first quadrature mixers.

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Claim 8 (original): A multiband data communication apparatus which transmits signals by switching a plurality of frequency band in response to a band switching signal, said multiband data communication apparatus comprising:

5 quadrature modulating means for converting a quadrature
6 transmission baseband signal into either a
7 transmission signal or a transmission intermediate
8 frequency signal, said quadrature modulating means
9 including-.

10 a pair of second quadrature mixers for converting a
11 transmission baseband signal into either the
12 transmission signal or the transmission intermediate
13 frequency signal;

14 storage means for saving thereinto discrete data of a
15 frequency pattern component functioning as a base
16 address generating means for generating an address every
17 preselected clock;

18 phase shift means for adding a predetermined number based
19 upon said band switching signal to said address;

20 first analog converting means for analog-converting data
21 which is read out by addressing said storage means
22 based on the address outputted from said address

23 generating means to thereby supply the analog-
24 converted data to one of said second quadrature
25 mixers; and
26 second analog converting means for analog-converting data
27 which is read out by addressing said storage means
28 based, on the output of said phase shift means to
29 thereby supply the analog-converted data to the
30 other of said second quadrature
31 mixers.

1 C/Catt
2 Claim 9 (original): A multiband data communication
3 apparatus comprising:

4 quadrature modulating means for converting a quadrature
5 transmission baseband signal into either a
6 transmission signal or a transmission intermediate
7 frequency signal;

8 quadrature demodulating means for converting either a
9 reception signal or a reception intermediate
10 frequency signal into a quadrature reception
11 baseband signal; and

12 local signal producing means for supplying a local
13 oscillation signal to both said quadrature
14 modulating means and said quadrature demodulating
15 means, for transmitting /receiving by switching a
16 plurality of frequency bands in response to a band
switching signal,

17 wherein: said quadrature demodulating means includes a
18 pair of first quadrature mixers for converting
19 either the', reception signal or the reception
20 intermediate frequency signal into a reception
21 baseband signal;

22 said quadrature modulating means includes a pair of
23 second quadrature mixers for converting a
24 transmission baseband signal into either the

25 transmission signal or the transmission intermediate
26 frequency signal; and
27 said local oscillation signal producing means includes
28 storage means for saving thereinto discrete data of
29 a frequency
30 pattern component functioning as a base; address
31 generating Means for generating an address every
32 preselected clock; phase shift means for adding a
33 predetermined. number based upon said band switching
34 signal to said address; first analog converting
35 means for analog-converting data which is read out
36 by addressing' said storage means based on the
37 address outputted from said address generating means
38 to thereby supply the analog-converted data to one
39 of said first quadrature mixers; and second analog
40 converting means for analog-converting data which is
41 read out by addressing said storage means based on
42 the output of said phase shift means to thereby
43 supply the analog-converted data to the other of
44 said first quadrature mixers.

1 Claim 10 (original) : A multiband data communication
2 apparatus as claimed in claim 7, 8, or 9, wherein either said
3 quadrature modulating means or said local oscillation signal
4 producing means includes clock generating means for generating
5 a clock signal;' and interval determining means for
6 determining a clock interval used to read out data from said
7 storage means so as to control the address generating
8 operation of said address generating means.

1 Claim 11 (currently amended) : A communication method of a
2 multiband data communication apparatus including quadrature
3 demodulating means for converting either a reception signal or
4 a reception intermediate frequency signal into a quadrature

5 reception baseband signal, for receiving by switching a
6 plurality of frequency bands in response to A band switching
7 signal, said communication method comprising the steps of:
8 producing a local oscillation signal; and
9 shifting a phase of said local oscillation signal in
10 response to said band switching signal to thereby
11 supply the phase-shifted local oscillation signal to
12 a first quadrature mixer for converting either the
13 reception signal or the reception intermediate
14 frequency signal into a reception baseband signal.

1 Claim 12 (original): A communication method of a
2 multiband data communication apparatus including quadrature
3 modulating means for converting a quadrature transmission
4 baseband signal into either a transmission signal or a
5 transmission intermediate frequency signal, for transmitting
6 by switching a plurality of frequency band in response to a
7 band switching signal, said communication method comprising
8 the steps of:

9 producing a local oscillation signal; and
10 shifting a phase of said local oscillation signal in
11 response to said band switching signal to
12 thereby supply the phase-shifted local
13 oscillation signal to a second quadrature mixer
14 for converting a transmission baseband signal
15 into either the transmission signal or the
16 transmission intermediate frequency signal.

1 Claim 13 (original): A communication method of a
2 multiband data communication apparatus including quadrature
3 modulating means for converting a quadrature transmission
4 baseband signal into either a transmission signal or a
5 transmission intermediate frequency signal; and quadrature
6 demodulating means for converting either a reception signal or

7 a reception intermediate frequency signal into a quadrature
8 reception baseband signal; which transmits and receives
9 signals by switching a plurality of frequency bands in
10 response to a band switching signal, said communication method
11 comprising the steps of:

12 producing a local oscillation signal; and
13 shifting a phase of said local oscillation signal in
14 response to the band switching signal to thereby
15 supply the phase-shifted local oscillation signal to
16 one of a first quadrature mixer and a second
17 quadrature mixer, said first quadrature mixer
18 converting either the reception signal or the
19 reception intermediate frequency signal into a
20 reception baseband signal, and said second
21 quadrature mixer converting a transmission baseband
22 signal into either the transmission signal or the
23 transmission intermediate frequency signal.

1 Claim 14 (original): A communication method of a
2 multiband data communication apparatus as claimed in claim 11,
3 12, or 13, wherein said phase shifting step includes:

4 a first supplying step for supplying a signal which is
5 obtained by shifting the phase of said local
6 oscillation signal. by $\pi/2$ to one of said first
7 quadrature mixer and said second quadrature mixer;
8 an inverting step for inverting a code of said local
9 oscillation signal; and
10 a second supplying step for supplying one of said local
11 oscillation signal and the output signal of said
12 inverting step to the other of said first quadrature
13 mixer and said second quadrature mixer in response
14 to said band switching signal.

1 Claim 15 (original): A communication method of a

2 multiband data communication apparatus as claimed in claim 11,
3 12, or 13, wherein said phase shifting step includes:
4 a first supplying step for supplying said local
5 oscillation signal to one of said first quadrature
6 mixer and said second quadrature mixer;
7 a phase shifting step for shifting the phase of said
8 local oscillation signal by $\pi/2$;
9 an inverting step for inverting a code of said output
10 signal of said phase shifting step; and
11 a second supplying step for supplying one of said output
12 signal of said phase shifting step and the output
13 signal of said inverting step to the other of said
14 first quadrature mixer and
15 said second quadrature mixer in response to said band
16 switching signal.

1 Claim 16 (original): A communication method of a
2 multiband data communication apparatus as claimed in claim 11,
3 12, or 13, wherein said phase shifting step includes:
4 a first supplying step for supplying said local
5 oscillation signal to one of said first quadrature
6 mixer and' said second quadrature mixer;
7 a phase delaying step for delaying the phase of said
8 local oscillation signal by $\pi/2$;
9 a phase advancing step for advancing the phase of said
10 local oscillation signal by $\pi/2$; and
11 a second supplying step for supplying one of the output
12 signal of said phase delaying step and the output
13 signal of said phase advancing step to the other of
14 said first quadrature mixer and said second
15 quadrature mixer in response to said band switching
16 signal.

1 Claim 17 (original): A communication method of a

2 multiband data communication apparatus including quadrature
3 demodulating means for converting either a reception signal or
4 a reception intermediate frequency signal into a quadrature
5 reception baseband signal, for receiving by switching a
6 plurality of frequency bands in response to a band switching
7 signal, said communication method comprising:

8 a storing step for saving thereinto discrete data, of a
9 frequency pattern component functioning as a base;
10 an address generating step for generating an address
11 every preselected clock;
12 a phase shifting step for adding a predetermined number
13 based upon said band switching signal to said
14 address;
15 a first analog converting step for analog-converting',
16 data which is read out by addressing said storing
17 step based on the address outputted from said
18 address generating step to thereby supply the
19 analog-converted data to one of first quadrature
20 mixers for converting either the reception signal or
21 the reception intermediate frequency signal into a
22 reception baseband signal; and
23 a second analog converting step for analog-convening data
24 which is read out by addressing said storing step
25 based on the output of said phase shifting step to
26 thereby supply the analog-converted data to the
27 other of said first quadrature mixers.

1 Claim 18 (original) : A communication method of a
2 multiband data communication apparatus including quadrature
3 modulating means for converting a quadrature transmission
4 baseband signal into either a transmission signal or a
5 transmission intermediate frequency signal, for transmitting
6 by switching a plurality of frequency band in response to a
7 band switching signal, said communication method comprising:

8 a storing step for saving thereinto discrete data of a
9 frequency pattern component functioning as a base;
10 an address generating step for generating an address
11 every preselected clock;
12 a phase shifting step for adding a predetermined number
13 based upon said band switching signal to said
14 address;
15 a first analog converting step for analog-converting data
16 which is read out by addressing said storing step
17 based on the address outputted from said address
18 generating step to thereby supply the analog-
19 converted data to one of second quadrature mixers
20 for converting a transmission baseband signal into
21 either the transmission signal or the transmission
22 intermediate frequency signal; and
23 a second analog converting step for analog--converting
24 data which is read out by addressing said storing
25 step based on the output of said phase shifting step
26 to thereby supply the analog-converted data to the
27 other of said second quadrature mixers.

1 Claim 19 (original): A communication method of a
2 multiband data communication apparatus including quadrature
3 modulating means for converting a quadrature transmission
4 baseband signal into either a transmission signal or a
5 transmission intermediate frequency signal; and quadrature
6 demodulating means for converting either a reception signal or
7 a reception intermediate frequency signal into a quadrature
8 reception baseband signal; and for transmitting /receiving by
9 switching a plurality of frequency bands in response to a band
10 switching signal, said communication method comprising:
11 a storing step for saving thereinto discrete data of a
12 frequency pattern component functioning as a base;

13 an address generating step for generating an address
14 every preselected clock;
15 a phase shifting step for adding a predetermined number
16 based upon said band switching signal to said
17 address;
18 a first analog converting step for analog-converting data
19 which is read out by addressing said storing step
20 based on' the address outputted from said address
21 generating step to thereby supply the analog-
22 converted data to one of a first quadrature mixer
23 and a second quadrature mixer, said first quadrature
24 mixer converting either the reception signal or the
25 reception intermediate frequency signal into a
26 reception baseband signal, and a second quadrature
27 mixer converting a transmission baseband signal into
28 either the transmission signal or the transmission
29 intermediate frequency signal; and
30 a second analog converting step for analog-converting
31 data which is read out by addressing said storing
32 step based on the output of said phase shifting step
33 to thereby supply the analog-converted data to the
34 other of said first quadrature mixer and said second
35 quadrature mixer.

1 Claim 20 (original): A storage medium for storing
2 thereinto a computer readable program used to execute the
3 communication method of the multiband data communication
4 apparatus as recited in claim 11, 12, 13, 14, 15, 16, 17, 18,
5 or 19.

1 21. (new) A multiband data communication apparatus which
2 receives signals by switching a plurality of frequency bands
3 in response to a band switching signal, said multiband data
4 communication apparatus comprising:

5 quadrature demodulating means for converting either a
6 reception signal or a reception intermediate
7 frequency signal into a quadrature reception
8 baseband signal, said quadrature demodulating means
9 including:
10 a pair of first quadrature mixers for converting
11 either the reception signal or the reception
12 intermediate frequency signal into a reception
13 baseband signal;
14 local oscillating means for producing a local
15 oscillation signal;
16 phase shifting means for shifting a phase of said
17 local oscillation signal for input to one of
18 said pair of first quadrature mixers; and
19 means for optionally changing a phase of said local
20 oscillation signal for input to another of said
21 pair of first quadrature mixers based upon said
22 band switching signal to thereby ensure correct
23 polarities of quadrature components of said
24 reception baseband signal.

1 Claim 22 (new): A multiband data communication
2 apparatus which receives signals by switching a plurality of
3 frequency bands in response to a band switching signal, said
4 multiband data communication apparatus comprising:
5 quadrature demodulating means for converting either a
6 reception signal or a reception intermediate
7 frequency signal into a quadrature reception
8 baseband signal, said quadrature demodulating means
9 including:
10 a pair of first quadrature mixers for converting
11 either the reception signal or the reception
12 intermediate frequency signal into a reception
13 baseband signal;

14 local oscillating means for producing a local
15 oscillation signal; and
16 phase shifting means for shifting a phase of said
17 local oscillation signal to ensure consistent
18 polarities of quadrature components of said
19 reception baseband signal irrespective of an
20 operating band of the apparatus.
